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Job No.: CTCE/BBMP/W.No.14/KRIDL/CC Blocks/2014-15 10.07.2014

TEST REPORT ON CEMENT CONCRETE BLOCKS

Client : **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of work : Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.

Reference : BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014

Size of Block : 400 mm x 200 mm x 200 mm

Cross Sectional Area : 80000 mm^2

Technical Reference : IS: 2185 (Part 1) - 2005

No. of Blocks Tested : 03

Sl.No.	Date of Sampling	Date of testing	Failure load (KN)	Compressive strength	Minimum Compressive Strength of Individual Units
			kN	N/mm^2	N/mm^2
1	08.07.2014	10.07.2014	259.3	3.24	3.2
2	08.07.2014	10.07.2014	260.5	3.26	
3	08.07.2014	10.07.2014	261.5	3.27	

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Job No.: CTCE/BBMP/W.No.14/KRIDL/Pre Cast Slab/2014-15

21.07.2014

TEST REPORT ON CEMENT CONCRETE CORE (PRE CAST SLAB)

Name of Customer	:	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Name of Agency	:	**Technical Manager (West),** KRIDL, Bangalore.
Name of work	:	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
Reference	:	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
Techinical Reference	:	IS:516-1959 (Reaffirmed 2008), SP-24:1983.
Sample ID	:	Pre cast slab
Date of Testing	:	21.07.2014

Sl. No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	50.00	80.00	0.393	2501.92	1.60	0.960	32.00	16.30	17.60	16.90	21.12
2	50.00	81.00	0.399	2508.75	1.62	0.965	33.00	16.81	18.15	17.52	21.90
3	50.00	82.00	0.410	2546.48	1.64	0.970	33.50	17.06	18.43	17.87	22.34

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Job No.: CTCE/BBMP/W.No.14/KRIDL/BM(QB)/2014-15 11.08.2014

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	:	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	:	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
REFERENCE	:	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
SOURCE OF LOCATION	:	Hot mix Plant, Bangalore
DATE OF TESTING	:	11.08.2014

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	82	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	44	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	296	Min. 220

Note:

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Job No: CTCE/BBMP/W.No.14/KRIDL/BM/AIV/2012-13

11.08.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
Source / Location	Hotmix Plant, Bangalore
Type of Mix	Bituminous Macadam
Date of Testing	11.08.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	390	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	86	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	303	303	
4	Aggregate Impact value = percent fines	22.11	22.31	
	$100^* (W_2/W_1)\%$			22.21

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Macadam is 30%

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Job No: CTCE/BBMP/W.No.14/KRIDL/BM/Shape.T/2014-15 : 11.08.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (West),** KRIDL, Bangalore.
Name of Work	: Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
Reference	: BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	: Bituminious Macadum
Date of Testing	: 11.08.2014

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Flakiness Index = **12.96%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **26.21%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Macadam is 30%

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Job No: CTCE/BBMP/W.No.14/KRIDL/BM/Stripping/2012-13

13.08.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the work	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
Type of Mix	Bituminous Macadam
Date of Testing	13.08.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.20	96.80
2	3.2		
3	3.3		

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Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Macadam is 95%

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Job No: CTCE/BBMP/W.No.14/KRIDL/BM/Sp_Wa/2012-13 13.08.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
Source / Location	Hotmix Plant, Bangalore.
Type of Mix	Bituminous Macadam
Date of Testing	13.08.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 2	
1	Weight of aggregate suspended in water with the basket	W_1 g	2024	2026	2025	
2	Weight of basket suspended in water	W_2 g	750	750	750	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1274	1276	1275	
4	Weight of saturated surface dry aggregate in air	W_3 g	2030	2025	2010	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	756	749	735	
6	Weight of oven dried aggregate	W_4 g	1999	2015	2010	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.644	2.690	2.735	2.689
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.757	2.727	2.735	2.746
9	Water Absorption	$((W_3-W_4)*100)/W_4$	1.55%	0.50%	0.00%	0.78%

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Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Macadam is 2.0%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/BM/Bitumen/2014-15 13.08.2014

BITUMEN CONTENT DETERMINATION OF BITUMINOUS MACADAM MIX

AS per IRC:SP:-1984

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
SAMPLE I/D	Roads Nisarga Layout in Ward No.14, BBMP, Bangalore.
DATE OF TESTING	13.08.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	482.5	482
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	17.5	18.00
7. Bitumen content in %	3.50	3.60
8. Average	**3.55**	

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Job No.: CTCE/BBMP/W.No.14/KRIDL/BM/Bitumen/2014-15 13.08.2014

GRADATION DETERMINATION OF BITUMINOUS MACADAM MIX

As per IS2386 and IRC:SP:11-1984

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
REFERENCE	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
SAMPLE I/D	Roads Nisarga Layout in Ward No.14, BBMP, Bangalore.
DATE OF TESTING	13.08.2014

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-04 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
26.5	0	0	0	100	100
19	35.62	7.38	7.38	92.62	90-100
13.2	95.65	19.82	27.21	72.79	56-88
4.75	261.3	54.16	81.36	18.64	16-36
2.36	43.23	8.96	90.32	9.68	4-19
0.3	33.26	6.89	97.21	2.79	2-10
0.075	5.25	1.09	98.30	1.70	0-8

Þ The results indicated above are based on the tests carried	Trail 2				Specified Limits as per MORTH specification table 500-04 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
26.5	0	0		100	100
19	35.12	7.29	7.29	92.71	90-100
13.2	73.26	15.20	22.49	77.51	56-88
4.75	259.6	53.86	76.34	23.66	16-36
2.36	53.26	11.05	87.39	12.61	4-19
0.3	22.32	4.63	92.02	7.98	2-10
0.075	9.21	1.91	93.94	6.06	0-8

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Job No: CTCE/BBMP/W.No.14/KRIDL/BM/Agg.G/2012-13 13.08.2014

Aggregate Gradation Test

IS : 2386 Part I

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the work	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
Sample ID	Hotmix Plant, Bangalore.
Type of Mix	Bituminous Macadam
Date of Testing	13.08.2014

Total Weight of Sample: 5200 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
26.5	0	0	0	100	100	Gradation satisfies Grade-II MORTH specification
19	362	6.96	6.96	93.04	90-100	
13.2	1685	32.40	39.37	60.63	56-88	
4.75	1488	28.62	67.98	32.02	16-36	
2.36	969	18.63	86.62	13.38	4-19	
0.3	386	7.42	94.04	5.96	2-10	
0.075	142	2.73	96.77	3.23	0-8	

Total Weight of Sample: 5300 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
26.5	0	0	0	100	100	Gradation satisfies Grade-II MORTH specification
19	296	5.58	5.58	94.42	90-100	
13.2	1783	33.64	39.23	60.77	56-88	
4.75	1525	28.77	68.00	32.00	16-36	
2.36	895	16.89	84.89	15.11	4-19	
0.3	412	7.77	92.66	7.34	2-10	
0.075	153	2.89	95.55	4.45	0-8	

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC(QB)/2014-15 13.08.2014

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
AGENCY	:	**Technical Manager (West),** KRIDL, Bangalore.
NAME OF THE WORK	:	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
REFERENCE	:	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
SOURCE OF LOCATION	:	Hot mix Plant, Bangalore
DATE OF TESTING	:	13.08.2014

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	88	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	45	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	296	Min. 220

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/AIV/2014-15 13.08.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	13.08.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	386	387	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.02	22.22	22.12

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

Note:

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Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	13.08.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	390	391	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	90	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	303	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	23.08	22.51	22.79

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

Note:

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಟಿ.ದಾಸರಹಳ್ಳಿ ಉಪ-ವಿಭಾಗ
ಬಾಗಲಗುಂಟೆ, ಬಿಬಿಎಂಪಿ
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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (West),** KRIDL, Bangalore.
Name of Work	: Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
Reference	: BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 13.08.2014

Result : Flakiness Index = **11.25%**

Elongation Index = **13.39%**

Result : Combined Flakiness & Elongation index **24.64%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Shape_T/2014-15 : 13.08.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (West),** KRIDL, Bangalore.
Name of Work	: Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
Reference	: BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 13.08.2014

Result : Flakiness Index = **12.32%**

Elongation Index = **13.85%**

Result : Combined Flakiness & Elongation index **26.17%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Stripping/2014-15

14.08.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the work	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	14.08.2014

Type of binder : 80/100

Percentage of binder used : 5.0% by wt.

Total weight of aggregate : 200 g

Total weight of binder : 10.0 g

Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.30	96.70
2	3.3		
3	3.4		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.14/KRIDL/SDBC/Sp_Wa/2014-15

14.08.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	14.08.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2020	2021	2022	
2	Weight of basket suspended in water	W_2 g	755	2020	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1265	1266	1267	
4	Weight of saturated surface dry aggregate in air	W_3 g	2013	2014	2014	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	748	748	747	
6	Weight of oven dried aggregate	W_4 g	2000	2002	2001	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.674	2.676	2.679	2.676
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.721	2.720	2.726	2.722
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.65%	0.60%	0.65%	0.63%

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Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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14.08.2014

Aggregate Gradation Test

IS : 2386 Part I

Client	**Asst. Executive Engineer,** T. Dasarahalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvement to road and drain at Nisarga Layout in Ward No.14, Bagalagunte, BBMP, Bangalore.
Reference	BBMP/DZ/AEE/TDSD/PR/2014-15 Dated: 02.07.2014
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	14.08.2014

Total Weight of Sample: **5250** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	360	6.9	6.86	93.14	90-100	
4.75	2685	51.1	58.00	42.00	35-51	
2.36	695	13.2	71.24	28.76	24-39	
1.18	490	9.3	80.57	19.43	15-30	
0.3	425	8.1	88.67	11.33	9-19	
0.075	335	6.4	95.05	4.95	3-8	

Total Weight of Sample: **5300** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	415	7.8	7.83	92.17	90-100	
4.75	2650	50.0	57.83	42.17	35-51	
2.36	835	15.8	73.58	26.42	24-39	
1.18	545	10.3	83.87	16.13	15-30	
0.3	250	4.7	88.58	11.42	9-19	
0.075	295	5.6	94.15	5.85	3-8	

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